Reprinted from the
SOUTHERN JOURNAL OF APPLIED FORESTRY
Vol. 6, No. 3, August 1982

Growth and Survival of Water Tupelo Coppice Regeneration After Six Growing Seasons

Harvey E. Kennedy, Jr.

*ABSTRACT. In the lower Atchafalaya Basin, water tupelo (*Nyssa aquatica *L.) trees were cut in May and November at three stump heights to study coppice regeneration. Sprouting was extremely good after one growing season, and live sprouts grew well through the third and fourth seasons. However, some stumps began to deteriorate and sprouts die after the second growing season. After six years, only 9 percent of the stumps cut in May and 18 percent of those cut in November had live sprouts.*

Water tupelo is found in cypress-tupelo swamps from southern Virginia to northern Florida; in southeastern Texas; and in the Mississippi Valley northward to Illinois, western Kentucky, and Tennessee. It normally grows in dense stands with or without cypress (*Taxodium distichum* (L.) Rich.) and other tupelos, and typically has a long, clean, strongly buttressed bole.

Trees are either cut near the top of the butt swell or felled and bucked to leave the basal wood. The butt swell may be from as little as one foot above ground line to as much as 8 to 10 feet, depending on flooding depth in the swamp. Water tupelo wood is valued for a number of products because of its white color, lack of odor or taste, good staining qualities, and nail-holding characteristics. The wood is exceptionally clear and used for veneer, box lumber, and furniture stock. The butt-swell portion has been shown to be suitable for pulpwood with the possibility of use in grease-proof papers and corregating medium (Laundrie and McKnight 1969).

Vast acreages of water tupelo are at or near merchantable size. When these stands are cut, we need to know if we can rely on the coppice method of regeneration to produce the next stand, and, if so, what effects stump height and season of cutting have on this regeneration.

METHODS

The study area is in Assumption Parish, about five miles east of Morgan City, Louisiana. Plots were located in a water tupelo stand on the western edge of the cleared area of a former oil well drilling site. The cleared area was about five acres, so trees in our plots had full access to sunlight from the east.

The stand was about 50 years old when cut and was almost pure water tupelo with a few scattered cypress. Basal area was 200 square feet per acre and trees were considered healthy. Trees averaged 15.9 inches diameter at stump height and 70 feet tall. The site is classified as swamp, with mixed clay alluvium soils.

The study area is outside the protection levees (floodway) of the Atchafalaya River, but part of a one million-acre area known as the Atchafalaya Basin. It is a permanently flooded swamp with water levels remaining about 12 inches deep throughout the year. The area is typical of large acreages found in deep swamps which do not dry out each year but dry only occasionally during periods of drought.

A split-plot design with three replications was used for this study. Three blocks, approximately 0.3 acre each, were laid out and divided into two subplots each. Either a May or November cutting date was randomly assigned to a subplot. One cutting height was randomly assigned each tree within a subplot. Five trees were cut at each height, a total of 15 trees per subplot or 45 trees per cutting date. All trees in a plot not used as study trees were cut when the study was installed.

Cutting was done in May and November 1971. Trees were cut at three stump heights: 6, 18, and 30 inches above the average 12-inch water level.

Variables measured after the first, second, fourth, and sixth growing seasons were survival (percent of stumps with at least one live sprout), number of sprouts per stump, sprout heights, and diameters. Tests were made at the 0.05 level of probability.

RESULTS AND DISCUSSION

Sprouting was extremely good after one growing season for both the May and November cuts (Table

Table 1. Average diameters, heights, and sprouting by cutting dates and stump height.

Stump height	1971 Diameter	1971 Height	1971 Sprouting	1972 Diameter	1972 Height	1972 Sprouting	1974 Diameter	1974 Height	1974 Sprouting	1976 Diameter	1976 Height	1976 Sprouting
In.	*In.*	*Ft.*	*Percent*	*In.*	*Ft.*	*Percent*	*In.*	*Ft.*	*Percent*	*In.*	*Ft.*	*Percent*
						May cutting						
6	0.5	3.4	80	0.5	4.3	40	2.1	10.3	7	0	0	0
18	0.7	4.5	78	1.2	7.2	87	2.7	13.0	7	2.9	13.1	7
30	0.6	4.1	73	1.1	7.8	67	2.0	11.1	33	2.2	10.7	20
						November cutting						
6				0.7	4.8	67	1.6	8.4	27	2.0	9.0	7
18				0.8	5.5	60	1.7	8.9	27	2.2	12.5	13
30				0.8	6.4	73	1.9	10.7	60	2.2	11.7	33

1). The percent of stumps sprouting was not significantly different between the two times of cutting nor among the three stump heights. Averaged over all trees, 77 percent of the trees cut in May and 67 percent of those cut in November had produced sprouts after one growing season. In 1974, after four years, the 30-inch stumps for both cutting dates had significantly higher survival than the 6- and 18-inch stumps. However, after six years (1976) these differences had disappeared. DeBell (1971) also reported good sprouting (63 percent) on high cut stumps (25 inches high) in swamp tupelo (*Nyssa sylvatica* var. *biflora* (Walt.) Sarg.) after one growing season. Stumps that had been cut 6 inches high (low stumps) had only 13-percent sprouting. He did not report results beyond the first growing season.

The number of sprouts in this study ranged from 1 to 18 with an average of 5 per stump. There was no apparent relationship between stump diameter and sprouting ability. Stump diameters ranged from 7.0 to 25.5 inches and averaged 15.9 inches across all trees.

Sprouts originated near the top or cut surface of the stumps regardless of stump height. This follows data reported by Hook and DeBell (1970) for seedlings of swamp and water tupelo and DeBell (1971) for mature trees of swamp tupelo, where they reported that sprouts usually originated high on the stump near the cut surface.

Sprout heights and diameters through six growing seasons are shown in Table 1. Sprouts averaged about 3 feet of height growth and 0.5–0.6 inches of diameter growth annually through four growing seasons (1974) for trees cut in May. Trees cut in November averaged slightly over 3 feet of height growth and 0.6 inches of diameter growth annually through three growing seasons (1974). It appeared that the sprouts were growing fast enough to sustain themselves and the stumps, but survival dropped drastically between 1972 and 1974.

Some stumps began to deteriorate and sprouts die after the second growing season. After six years, only 9 percent of the stumps from the May cutting and 18 percent from the November cutting had live sprouts when averaged over all cutting heights. These trends are the same as observed by foresters in the Atchafalaya Basin, where water tupelo trees were cut for canal right-of-ways.[1] In the study by DeBell (1971), when one block was remeasured, 45 percent of the stumps with sprouts that had been observed at one year had died after four growing seasons.[2] Thus, only about one out of three stumps had live sprouts after four years. I found a similar result in the Atchafalaya Basin. The present study found that stumps that had live sprouts after six years were badly deteriorated and the sprouts had a stunted, rosette appearance. However, this appearance could have been caused by defoliation nearly every year by the forest tent caterpillar (*Malacosoma disstria* Hbn.). Stumps that did not have live sprouts had deteriorated until they were very difficult to find and identify.

Our results are similar to those of Allen (1962), who reported that black willow (*Salix nigra* Marsh.) dominated a baldcypress-tupelo swamp eight years after clearcutting. Tupelo coppiced vigorously from high on some stumps throughout the whole area, but its reproduction and that of baldcypress was patchy and insufficient to start a new stand.

Hook et al. (1967) reported on coppicing of water tupelo 30 years after logging in the Wateree Swamp in South Carolina. Vigorous sprouts persisted on stumps of all sizes and were intermixed with trees of seed origin. In certain areas this mixture predominated while in other areas stump sprouts and trees of seed origin were intermingled with remnants of the parent stand. The percentage of the stand of sprout origin was not reported.

---

[1] Personal communication with Hugh Brown, vice president for timber, lands, and oil, Williams, Inc., New Orleans, Louisiana.

[2] Personal communication with O. Gordon Langdon, project leader, U.S. Forest Service, Charleston, South Carolina; and unpublished data on file at Charleston.

CONCLUSIONS

Coppicing of water tupelo in the Atchafalaya Basin does not appear to be a satisfactory method of regeneration. The surviving sprouts are too few to fully utilize the site. Only 9 to 18 percent of the stumps had live sprouts after six growing seasons, and, as reported by Allen (1962), tupelo reproduction would be patchy and insufficient. Other researchers (Hook et al. 1967) have reported good reproduction with coppice tupelo, but flood water depths and duration may have been different in their studies. It appears that coppicing water tupelo may or may not be successful. Water management to create the right environment may be very important in determining success or failure.

Literature Cited

ALLEN, PETER H. 1962. Black willow dominates baldcypress-tupelo swamp eight years after clear cutting. U.S. Dep. Agric. For. Serv. Res. Note 177, 2 p. Southeast. For. Exp. Stn., Asheville, N.C.

DEBELL, DEAN S. 1971. Stump sprouting after harvest cutting in swamp tupelo. U.S. Dep. Agric. For. Serv. Res. Pap. SE-83, 6 p. Southeast. For. Exp. Stn., Asheville, N.C.

HOOK, DONAL D., and DEAN S. DEBELL 1970. Factors influencing stump sprouting of swamp and water tupelo seedlings. U.S. Dep. Agric. For. Serv. Res. Pap. SE-57, 9 p. Southeast. For. Exp. Stn., Asheville, N.C.

HOOK, DONAL D., W. P. LEGRANDE, and O. GORDON LANGDON. 1967. Stump sprouts on water tupelo. South. Lumberman 215(2680):111–112.

LAUNDRIE, J. F., and J. S. MCKNIGHT. 1969. Butt swells of water tupelo for pulp and paper. U.S. Dep. Agric. For. Serv. Res. Pap. FPL-119, 12 p. Forest Products Lab., Madison, Wis.

Harvey E. Kennedy, Jr. is principal silviculturist, Southern Hardwoods Laboratory, Stoneville, Mississippi, Southern Forest Experiment Station, USDA Forest Service, in cooperation with the Mississippi Agricultural and Forestry Experiment Station and the Southern Hardwood Forest Research Group.